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(54) **COMPOUNDS AND COMPOSITIONS FOR OSSIFICATION AND METHODS RELATED THERETO**

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(58) **Field of Classification Search**

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See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,823,161 A 2/1958 Lux
6,489,333 B2 12/2002 Pitts

(Continued)

FOREIGN PATENT DOCUMENTS

WO 2010085246 7/2010
WO 2011018742 2/2011

OTHER PUBLICATIONS

Xiang (Synthesis and Bioactivity Study of 4,6-diamino-1,3,5-triazines, National University of Singapore, 2006).*

(Continued)

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(57)

ABSTRACT

The disclosure relates to compounds and compositions for forming bone and methods related thereto. In one embodiment, the disclosure relates to a composition comprising a compound disclosed herein, such as 2,4-diamino-1,3,5-triazine derivatives or salts thereof, for use in bone growth processes. In a typical embodiment, a bone graft composition is implanted in a subject at a site of desired bone growth or enhancement.

18 Claims, 26 Drawing Sheets

